BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY

CONTENTS

Vol. 40, No. 1 January 2003

### Bulletin Articles

**Donald G. Saari,** Editor's Comment ..... 1
**Simon A. Levin,** Complex adaptive systems: Exploring the known, the unknown and the unknowable ..... 3
**Edward Witten,** Physical law and the quest for mathematical understanding ..... 21
**Michael H. Freedman, Alexei Kitaev, Michael J. Larsen, and Zhenghan Wang,** Topological quantum computation ..... 31
**James Arthur,** The principle of functoriality ..... 39
**Richard P. Stanley,** Recent progress in algebraic combinatorics ..... 55
**Jean E. Taylor,** Some mathematical challenges in materials science ..... 69
**S. R. S. Varadhan,** Stochastic analysis and applications ..... 89

### Book Reviews

**Gigliola Staffilani** (Reviewer), Global solutions of nonlinear Schrödinger equations by J. Bourgain ..... 99
**Heini Halberstam** (Reviewer), Sieves in number theory by George Greaves ..... 109
**Robert M. Hardt** (Reviewer), Constant mean curvature surfaces, harmonic maps and integrable systems by Frédéric Hélein ..... 121
**William Ewald** (Reviewer), The search for mathematical roots, 1870-1940: Logics, set theories, and the foundations of mathematics from Cantor through Russell to Gödel by I. Grattan-Guinness ..... 125
**Edward Formanek** (Reviewer), Selected papers of S. A. Amitsur with commentary by Avinoam Mann, Amitai Regev, Louis Rowen, David J. Saltman, and Lance W. Small (eds.) ..... 131
**Bernhard Krötz** (Reviewer), Spherical inversion on $\mathrm{Sl}(n,\mathbb{R})$ by Jay Jorgenson and Serge Lang ..... 137
**Steven G. Krantz** (Reviewer), A new kind of science by Stephen Wolfram ..... 143
**Richard Weiss** (Reviewer), Abstract root subgroups and simple groups of Lie-type by Franz Georg Timmesfeld ..... 151

Vol. 40, No. 2 April 2003

### Bulletin Articles

**Persi Diaconis,** Patterns in eigenvalues: The 70th Josiah Willard Gibbs Lecture ..... 155

**Haim Brezis,** The interplay between analysis and topology in some nonlinear PDE problems ..... 179
**Saharon Shelah,** Logical dreams ..... 203
**Michael Berry,** Making light of mathematics ..... 229

**Book Reviews**

**Alan Roche** (Reviewer), The geometry and cohomology of some simple Shimura varieties by Michael Harris and Richard Taylor ..... 239
**Lucy Lifschitz** (Reviewer), Tree lattices by Hyman Bass and Alexander Lubotzky ..... 247
**Brian Parshall** (Reviewer), Essays in the history of Lie groups and algebraic groups by Armand Borel ..... 253
**Walter Kelley** (Reviewer), Theory of difference equations — numerical methods and applications by V. Lakshmikantham and Donato Trigiante ..... 259

**Vol. 40, No. 3** **July 2003**

**Bulletin Articles**

**John Franks,** Rotation numbers and instability sets ..... 263
**Mariusz Urbański,** Measures and dimensions in conformal dynamics ..... 281
**Herwig Hauser,** The Hironaka theorem on resolution of singularities (Or: A proof we always wanted to understand) ..... 323

**Book Reviews**

**Jair Koiller** (Reviewer), Analytical mechanics: A comprehensive treatise on the dynamics of constrained systems; for engineers, physicists and mathematicians by John G. Papastavridis ..... 405
**Palle E. T. Jorgensen** (Reviewer), An introduction to wavelet analysis by David F. Walnut ..... 421

**Vol. 40, No. 4** **October 2003**

**Bulletin Articles**

**Jean-Pierre Serre,** On a theorem of Jordan ..... 429
**Peter Sarnak,** Spectra of hyperbolic surfaces ..... 441
**Josef Hofbauer and Karl Sigmund,** Evolutionary game dynamics ..... 479

**Book Reviews**

**Peter E. Trapa** (Reviewer), Lie groups: An introduction through linear groups by Wulf Rossmann ..... 521
**Steven G. Krantz** (Reviewer), Partial differential equations in several complex variables by So-Chin Chen and Mei-Chi Shaw ..... 529
**David E. Rowe** (Reviewer), Mathematics unbound: The evolution of an international mathematical research community, 1800–1945 by Karen Hunger Parshall and Adrian C. Rice (eds.) ..... 535